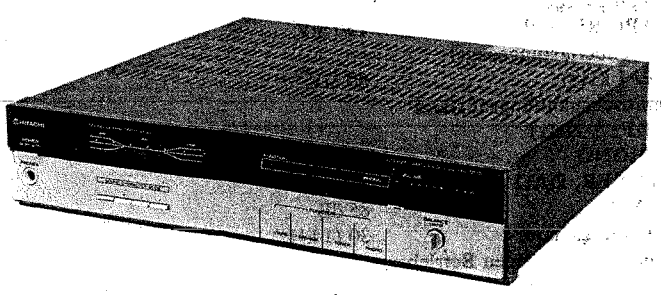
# HITACHI
# SERVICE MANUAL

**TY** **No.346 EGF**

# HA-MD3



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## SAFETY PRECAUTIONS

The following precautions should be observed when servicing.

1. Since many parts in the unit have special safety related characteristics, always use genuine Hitachi's replacement parts. Especially critical parts in the power circuit block should not be replaced with other makers. Critical parts are marked with ⚠ in the schematic diagram and circuit board diagram.
2. Before returning a repaired unit to the customer, the service technician must thoroughly test the unit to ascertain that it is completely safe to operate without danger of electrical shock.

## SPECIFICATIONS

* Measured pursuant to the Federal Trade Commission's Trade Regulation Rule on Power Output Claims for Amplifiers.

| | |
|---|---|
| Power output (Both channels driven) | 30 Watts* per channel, min. RMS, at 8 ohms from 40 Hz to 20 kHz, with no more than 0.2% total harmonic distortion.<br>30 W/ch + 30 W/ch (8 ohms, 1 kHz, T.H.D. 0.2%, SINUS)<br>35 W/ch + 35 W/ch (8 ohms, 40 Hz – 20 kHz, T.H.D. 0.2%) |
| Harmonic distortion (8 ohms) (at 1/2 rated output) | 0.1% |
| Intermodulation distortion (at 1/2 rated output) | 0.1% |
| Power bandwidth | 10 Hz – 30 kHz, (T.H.D. 0.2%, 1/2 Rated) |
| Frequency characteristics | |
| PHONO | 30 Hz – 15 kHz, RIAA ±0.5 dB |
| TUNER,DAD/AUX, TAPE | 20 Hz – 40 kHz ($\frac{+1}{-3}$dB) |
| Input sensitivity/Impedance | |
| PHONO | 3 mV/47 k-ohms |
| TUNER | 160 mV/40 k-ohms |
| DAD/AUX | 160 mV/40 k-ohms |
| TAPE PLAY | 160 mV/40 k-ohms |
| Output level | |
| TAPE REC OUT | 150 mV |
| Phono overload level (at 1 kHz) | 80 mV |
| Signal-to-noise ratio (IHF, A network) | |
| PHONO | 72 dB |
| TUNER, DAD/AUX, TAPE | 85 dB |
| Damping factor | 30 (1 kHz) |
| Effects by each mode | 1 : Flat<br>2 : 100 Hz +6 dB, 10 kHz +4 dB<br>3 : 100 Hz −3 dB<br>4 : 7 kHz −3 dB |
| Power supply | AC 120V 60 Hz<br>~220V 50/60 Hz,<br>~120V/220V/240V 50/60 Hz |
| Power cosumption | 110W (at 1/3 rated output)<br>180W (at rated output) |
| Dimensions | 320(W) × 72.5(H) × 284(D) mm |
| Weight | 4.6kg |

**SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT.**

# STEREO AMPLIFIER


**October 1982** **TOYOKAWA WORKS**

## SICHERHEITSMASSNAHMEN

Bei Wartungsarbeiten sind die folgenden Sicherheitsmaßnahmen zu beachten:

1. Da verschiedene Teile dieses Gerätes Sicherheitsfunktionen aufweisen, nur Original-Hitachi-Ersatzteile verwenden. Kritische Teile im Netzteil sollten nicht durch ähnliche Teile anderer Hersteller ersetzt werden. Alle kritischen Teile sind im Schaltplan und im Diagramm der Schaltplantinen mit dem Symbol ⚠ gekennzeichnet.
2. Vor der Auslieferung eines reparierten Gerätes an den Kunden muß der Wartungstechniker das Gerät einer gründlichen Prüfung unterziehen, um sicherzustellen, daß sicherer Betrieb ohne die Gefahr von elektrischen Schlägen gewährleistet ist.

## TECHNISCHE DATEN

* Wurde gemäß den Handelsbestimmungen des Bundeshandelsauftrags für Ausgangsleistungsansprüche von Verstärkern gemessen.

| | |
|---|---|
| Ausgangsleistung (2-Kanalbetrieb) | 30 Watt*/Kanal, min. RMS, an 8 Ohm, 40 Hz bis 20 kHz, 0,2% Klirr<br>30 Watt/Kanal + 30 Watt/Kanal (8 Ohm, 1 kHz, 0,2% Klirr, Nennleistung)<br>35 Watt/Kanal +35 Watt/Kanal (8 Ohm, 40 Hz – 20 kHz, 0,2% Klirr) |
| Klirrfaktor (8 Ohms) (bei halber Nennleistung) | 0,1% |
| Intermodulationsverzerrung (bei halber Nennleistung) | 0,1% |
| Leistungsbandbreite | 10 Hz – 30 kHz, (0,2% Klirr bei halber Nennleistung) |
| Frequenzcharakteristik | |
| PHONO | 30 Hz – 15 kHz, RIAA-Kennlinie ±0,5 dB |
| TUNER, DAD/AUX<br>TAPE | 20 Hz – 40 kHz ($\frac{+1}{-3}$ dB) |
| Eingangsempfindlichkeit/ Impedanz | |
| PHONO | 3 mV/47 kOhms |
| TUNER | 160 mV/40 kOhms |
| DAD/AUX | 160 mV/40 kOhms |
| TAPE PLAY | 160 mV/40 kOhms |
| Ausgangspegel | |
| TAPE REC OUT | 150 mV |
| Phonoüberlastungspegel (bei 1 kHz) | 80 mV |
| Geräuschspannungsabstand (IHF, A-Netz) | |
| PHONO | 72 dB |
| TUNER, DAD/AUX, TAPE | 85 dB |
| Dämpfungsfaktor | 30 (1 kHz) |
| Effekte der einzelnen Betriebsarten | 1 : flach<br>2 : 100 Hz +6 dB, 10 kHz +4 dB<br>3 : 100 Hz −3 dB<br>4 : 7 kHz −3 dB |
| Netzspannung | 120V, 60 Hz Wechselstrom<br>~220V 50/60 Hz,<br>~120V/220V/240V 50/60 Hz |
| Leistungsaufnahme | 110 W (bei 1/3 Nennleistung)<br>180 W (bei Nennleistung) |
| Abmessungen | 320(B) × 72,5(H) × 284(T) mm |
| Gewicht | 4.6 kg |

## PRÉCAUTIONS DE SÉCURITÉ

Les précautions suivantes doivent être observées chaque fois qu'une réparation doit être faite.

1. Etant donné que de nombreux composants de l'appareil possèdent des caractéristiques relatives à la sécurité, utiliser uniquement des pièces de rechange d'origine Hitachi pour effectuer un remplacement. Ceci se rapporte notamment aux piéces critiques du bloc d'alimentation qui ne doivent en aucun cas être remplacées par celles d'autres fabricants. Les piéces critiques sont accompagnés du symbole ⚠ dans le schéma de montage et sur le schéma de plaque de câblage.
2. Avant de retourner l'appareil réparé au client, le technicien doit procéder à un essai complet pour s'assurer qu'il ne présente aucun danger de chocs électriques.

## CARACTERISTIQUES TECHNIQUES

* Mesures conformes aux réglements commerciaux de la Federal Trade Commission relatifs à la puissance de sortie des amplificateurs.

| | |
|---|---|
| Puissance de sortie (deux canaux) | 30 watts* par canal minimum RMS à 8 ohms de 40 Hz à 20 Hz, distortion harmonique inférieure à 0,2%<br>30 W/canal + 30 W/canal (8 ohms, 1 kHz, D.H.T. 0,2%, sinus)<br>35 W/canal + 35 W/canal (8 ohms, 40 Hz – 20 kHz, T.H.D. 0,2%) |
| Distortion harmonique (8 ohms) (à 1/2 de sortie nominale) | 0,1% |
| Distortion d'intermodulation (à 1/2 de sortie nominale) | 0,1% |
| Gamme de fréquence | 10 Hz – 30 kHz (D.H.T. 0,2%, 1/2 de sortie nominale) |
| Caractéristiques de fréquence | |
| PHONO | 30 Hz à 15 kHz, RIAA ±0,5 dB |
| TUNER, DAD/AUX, TAPE | 20 Hz à 40 kHz ($\frac{+1}{-3}$ dB) |
| Sensibilité d'entrée/impédance | |
| PHONO | 3 mV/47 kohms |
| TUNER | 160 mV/40 kohms |
| DAD/AUX | 160 mV/40 kohms |
| TAPE PLAY | 160 mV/40 kohms |
| Niveau de sortie | |
| TAPE REC OUT | 150 mV |
| Niveau de surcharge de table de lecture (à 1 kHz) | 80 mV |
| Rapport signal/bruit (IHF, réseau A) | |
| PHONO | 72 dB |
| TUNER,DAD/AUX, TAPE | 85 dB |
| Facteur d'amortissement | 30 (1 kHz) |
| Effets sur chaque mode | 1 : Plat<br>2 : 100 Hz +6 dB, 10 kHz +4 dB<br>3 : 100 Hz −3 dB<br>4 : 7 kHz −3 dB |
| Modes d'alimentation | Secteur 120 V, 60 Hz<br>~220V 50/60 Hz,<br>~120V/220V/240V 50/60 Hz |
| Consommation | 110W (à 1/3 de sortie nominale)<br>180W (sortie nominale) |
| Dimensions | 320(L) × 72,5(H) ×284(P) mm |
| Poids | 4.6 kg |

## FEATURES

1. Adoption of sound character mode
2. Input selection by panel switch
3. Compact design of electronic feeling

## MERKMALE

1. Verwendung von Klangcharakterbetriebsart
2. Eingangsumschaltung mit Plattenschalter
3. Geringe Größe und moderner Entwurf in elektronischem Stil

## CARACTERISTIQUES

1. Utilisation du mode de caractère de son
2. Sélection d'entrée par le commutateur sur tableau
3. Construction compacte au sens électronique

## DISASSEMBLY AND REPLACEMENT • ZERLEGUNG UND AUSTAUSCH • DEMONTAGE ET REMONTAGE

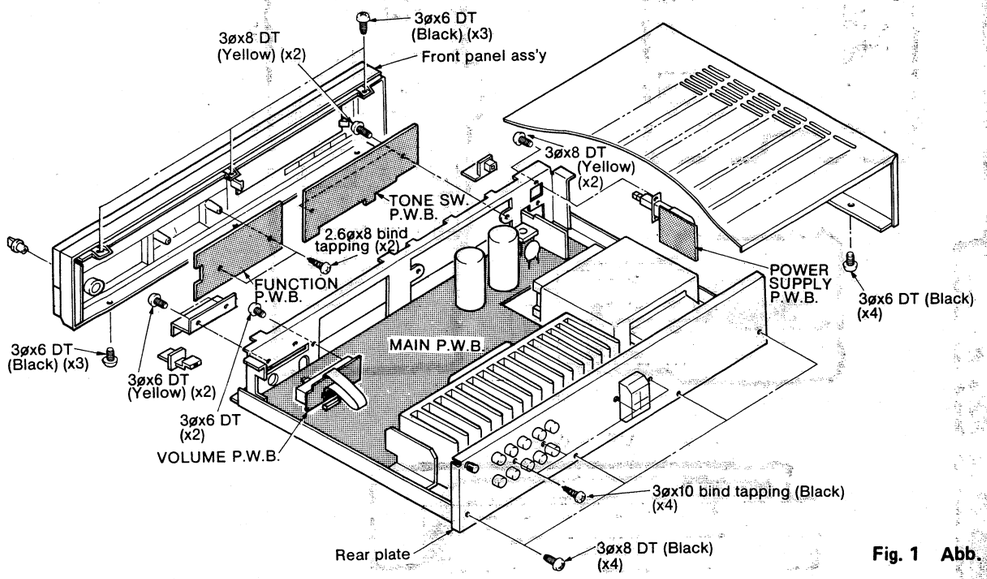



Fig. 1 Abb. 1

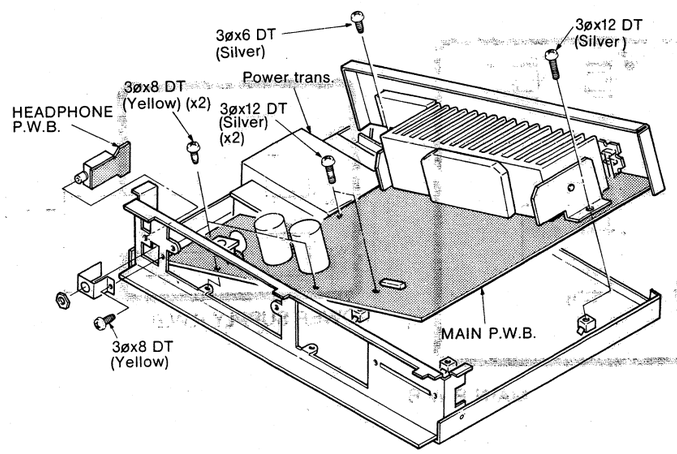



Fig. 2 Abb. 2





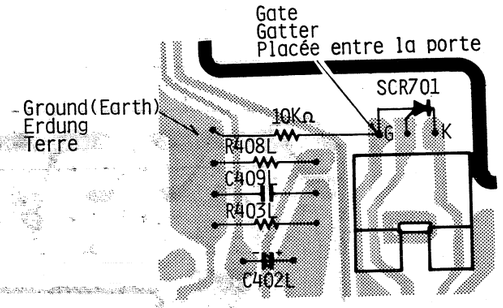
## CHECKING THE OPERATION OF THE PROTECTION CIRCUIT
## KONTROLLE DER FUNKTION DER SCHUTZSCHALTUNG
## CONTROLE DE FONCTIONNEMENT DU CIRCUIT DE PROTECTION

When the output circuit is repaired by replacing the power IC, etc., perform an operation check on the ASO (Area of Safe Operation) detection circuit, the speaker protection circuit and temperature detection circuit.

**Temperature detection circuit**

Set the speaker terminals to the no-load condition and check that the realy operates 2-3 sec after the power switch is set to ON. Next, when the 10 kohms resistor is inserted between the SCR701 gate and GND, the relay is kept at OFF, and OFF with the resistor removed.

Set the power switch OFF and then set it to ON again after approx. 1 minute or more. The operation is normal when the relay is set to ON after 2-3 sec.




Wenn die Ausgangsschaltung repariert worden ist, z.B. durch Auswechseln der Leistungs-IC usw., so muß Betriebsprüfung für den ASO-Entdeckungsstromkreis (ASO = Area of Safe Operation), den Lautsprecher-Schutzstromkreis und die Temperatur-Detektor-schaltung durchgeführt werden.

**Temperatur-Detektorschaltung**

Die Lautsprecherklemmen freigeben (keine Last) und darauf achten, daß das Relais 2 bis 3 Sekunden nach dem Einschalten des Netzschalters arbeitet. Wenn danach ein 10 kOhm Widerstand zwischen dem Tor von SCR701 und Masse (GND) eingeschoben wird, so muß das Relais abschalten, und es muß in abgeschaltetem Zustand (OFF) verbleiben, wenn der Widerstand entfernt wird.

Den Netzschalter ausschalten (OFF) und nach etwa 1 Minute wieder einschalten (ON). Der Betrieb ist normal, wenn das Relais nach 2 bis 3 Sekunden eingeschaltet wird.

Quand le circuit de sortie est réparé à la suite du remplacement des circuits intégrés de puissance, etc., effectuer une vérification de fonctionnement du circuit de détection de type ASO, du circuit de protection de haut-parleur et du circuit de détection de température.

**Circuit de détection de température**

Placer les bornes de haut-parleurs en condition sans charge et vérifier si le relais fonctionne 2 à 3 secondes après avoir placé l'interrupteur général en position "ON". Ensuite, lorsqu'une résistance de 10 kohms est placée entre la porte de SCR701 et la masse GND, le relais est maintenu à l'arrêt et est à l'arrêt lorsque la résistance est supprimée.

Placer l'interrupteur général en position "OFF" et le ramener à nouveau en position "ON" 1 minute après ou plus. Le fonctionnement est considéré comme normal lorsque le relais se place en position "ON" 2 à 3 secondes plus tard.

## DESCRIPTION OF THE NEW PARTS • BESCHREIBUNG DES NEUEN TEILS • DESCRIPTION DE LA NOUVELLE PIÈCE

**TM2001A (power module • Leistungsmodul • module de puissance)**

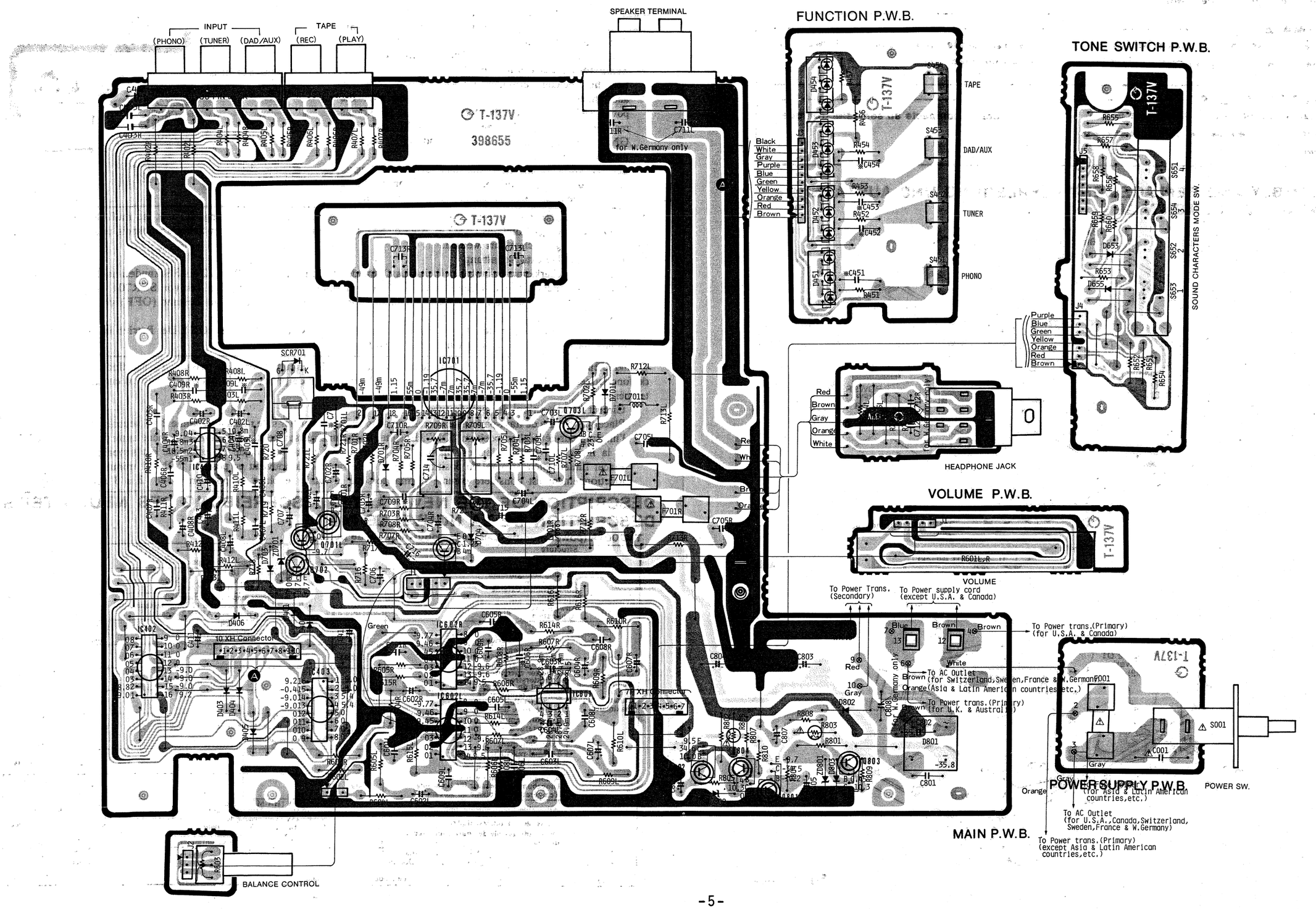
(Ta = 25°C)

| | | | | | |
|---|---|---|---|---|---|
| | Structure<br>Konstruktion<br>Construction | | Thick film integrated circuit<br>Dickfilm-IC<br>Circuit intégré couche épaisse | | |
| | External configuration<br>Äußere Form<br>Configuration externe | | Single inline 18 pins<br>Einzel-IN-Line-Element, 18 Stifte<br>Ligne d'entrée simple 18 broches | | |
| | Application<br>Anwendung<br>Application | | AF power amp (with 2 channels)<br>AF-Leistungsverstärker (2 Eingangskanäle)<br>Ampli de puissance AF (à 2 canaux) | | |
| | Item<br>Punkt<br>Rubrique | Symbol<br>Symbole | Condition<br>Bedingungen<br>Condition | Max. value<br>Max. Nennwerte<br>Valeur max. | Unit<br>Einheit<br>Unité |
| Max. rating<br>Maximale Kennwerte<br>Caractéristiques maximales | Source voltage<br>Stromversorgungsspannung<br>Tension de secteur | Vccmax | | ±51 | V |
| | Collector current<br>Kollektorstrom<br>Courant de collecteur | Icmax | | 5 | A |
| | Junction temperature<br>Kontaktstellentemperatur<br>Température de jonction | Tjmax | | +150 | °C |
| | IC board temperature at operation<br>Temperatur der IC-Grundplatte beim Betrieb<br>Température de la plaquette à CI en fonctionnement | Tcmax | At middle of IC board<br>Temperatur in der Mitte der IC-Grundplatte<br>Au milieu de la plaque à CI | +120 | °C |
| | Thermal resistance<br>Wärmewiderstand<br>Résistance thermique | Oj-c | | 2,2 | °C/W |
| | Ambient temperature at storage<br>Umgebungstemperatur für Lagerung<br>Température ambiante au stockage | Tstg | | −33~ +120 | °C |
| | Allowable load shorting time<br>Zulässige Lastkurzschlußzeit<br>Durée admissible de court-circuitage de charge | ts | Vcc=±45V (HA-M33 transformer used)<br>fs – 10 Hz, Vo – 2.0V (at 8 ohm)<br>Vcc=±45V (Verwendung des Transformators HA-M33)<br>f s =10 Hz, Vo=2,0V (bei 8 Ohmz)<br>Vcc=±45 V (avec transformateur HA-M33)<br>f s – 10 Hz, Vo – 2,0 V (au 8 ohm) | 2 sec or more<br>Min. 2 Sekunden<br>2 s ou plus | sec<br>Sekunden<br>s |
| Others<br>Sonstiges<br>Divers | Warp of module base (bottom plate)<br>Verzug der Modulbasis (Bodenplatte)<br>Gauchissement de la base de module (plaque de fond) | | | 150 μm max.<br>Innerhalb von 150 μm<br>150 μm max. | μm |

## PRINTED WIRING BOARD • PRINTPLATTEN • PLAN DE BASE

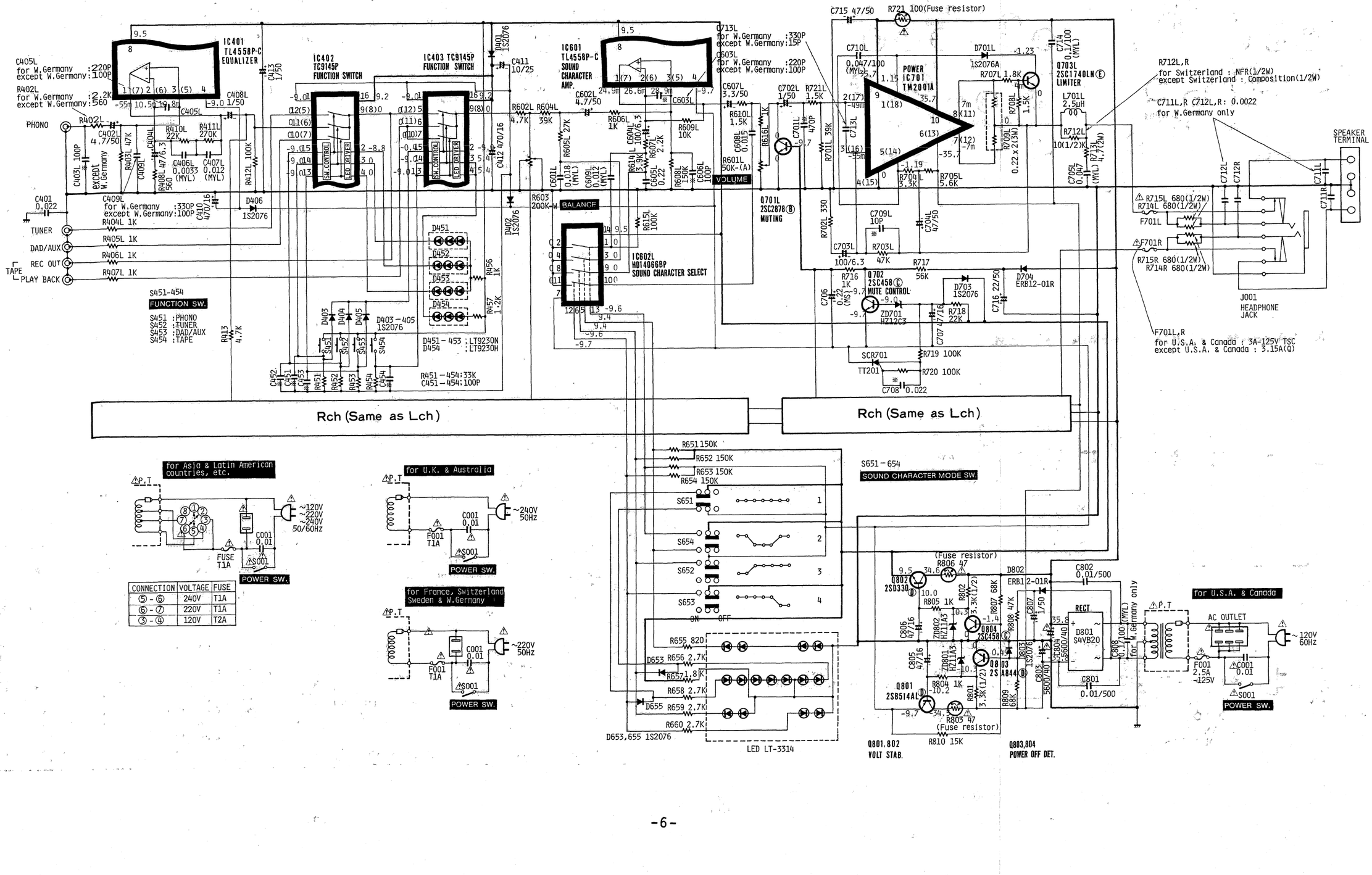
[ ■ :+B, ■ :−B, ■ :Earth, ■ :Other]

※ : Axial lead cylindrical ceramic capacitor
※ : Zylindrischer Keramikkondensator mit axialer suleitung
※ : Condensateur céramique cylindrique à conducteur axial



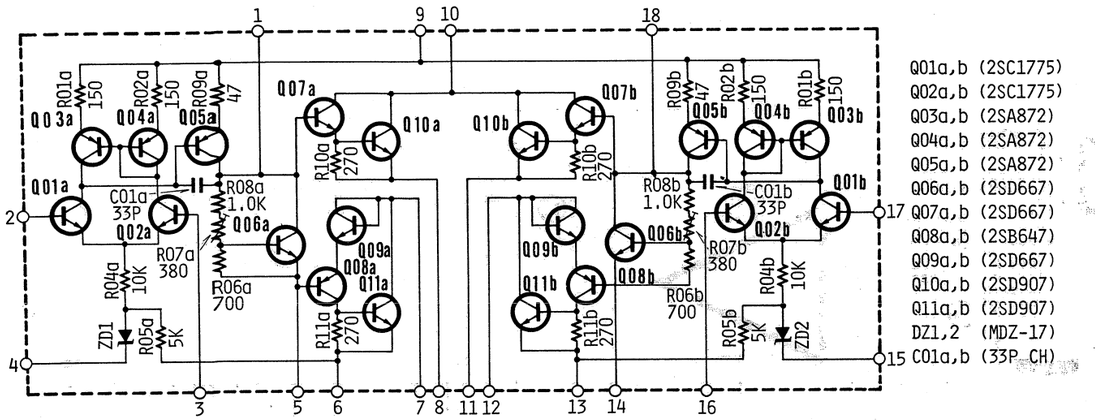
## CIRCUIT DIAGRAM • SCHALTPLAN • PLAN DE CIRCUIT

※ : Axial lead cylindrical ceramic capacitor
※ : Zylindrischer Keramikkondensator mit axialer suleitung
※ : Condensateur céramique cylindrique à conducteur axial



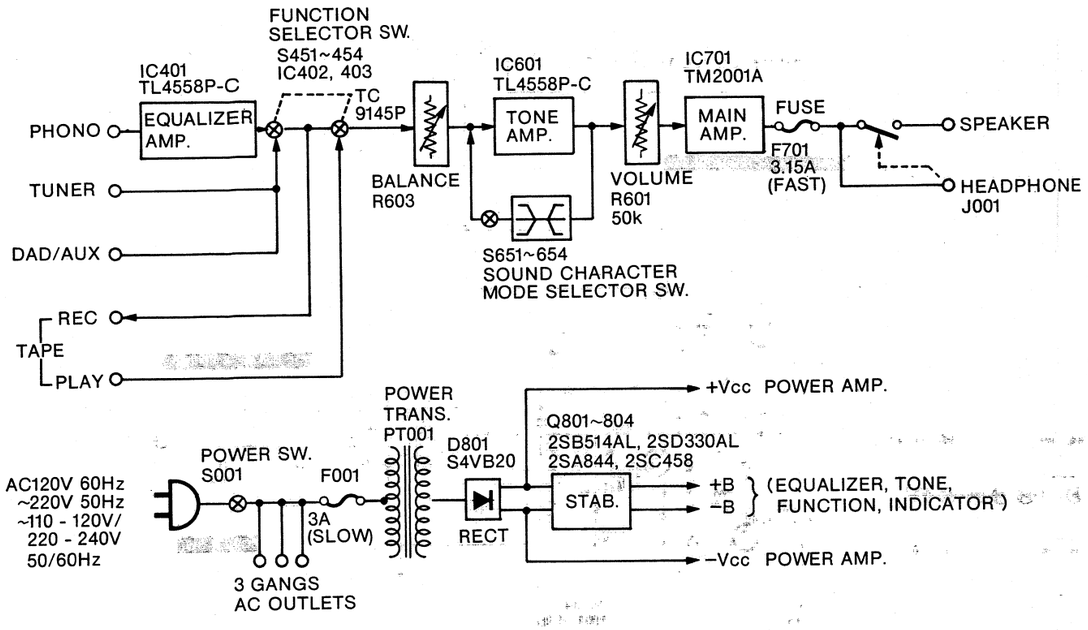
HITACHI HA-MD3

**Equivalent circuit**
**Äquivalenter stromkreis**
**Schéma équivalent**




Q01a,b (2SC1775)
Q02a,b (2SC1775)
Q03a,b (2SA872)
Q04a,b (2SA872)
Q05a,b (2SA872)
Q06a,b (2SD667)
Q07a,b (2SD667)
Q08a,b (2SB647)
Q09a,b (2SD667)
Q10a,b (2SD907)
Q11a,b (2SD907)
DZ1,2 (MDZ-17)
C01a,b (33P CH)

## BLOCK DIAGRAM • BLOCK SCHEMA • SCHEMA






## REPLACEMENT PARTS LIST •ERSATZTEILLISTE• TABLEAU DES PLÉCE

| SYMBOL No. | PART No. | DESCRIPTION | | |
|---|---|---|---|---|
| | | **CAPACITORS** | | |
| C401 | 0244173 | Ceramic, discal | 0.022 μF $^{+80}_{-20}$% | 50 V |
| C402LR | 0252815 | Electrolytic | 4.7 μF | 50 V |
| C403LR | 0230036 | Cylindrical ceramic | 100 pF ±5% | 50 V |
| C404LR | 0252225 | Electrolytic | 47 μF | 6.3 V |
| C405LR | 0230036 | Cylindrical ceramic (except W. Germany) | 100 pF ±5% | 50 V |
| C405LR | 0240004 | Cylindrical ceramic (for W. Germany) | 220 pF ±10% | 50 V |
| C406LR | 1274214 | Mylar, film | 3300 pF ±5% | 50 V |
| C407LR | 1275231 | Mylar, film | 0.012 μF±5% | 50 V |
| C408LR | 0252811 | Electrolytic | 1 μF | 50 V |
| C409LR | 0230036 | Cylindrical ceramic (except W. Germany) | 100 pF ±5% | 50 V |
| C409LR | 0240006 | Cylindrical ceramic (for W. Germany) | 330 pF ±10% | 50 V |
| C410 | 0252535 | Electrolytic | 470 μF | 16 V |
| C411 | 0252621 | Electrolytic | 10 μF | 25 V |
| C412 | 0252535 | Electrolytic | 470 μF | 16 V |
| C413 | 0252811 | Electrolytic | 1 μF | 50 V |
| C451 ≀ C454 | 0230036 | Cylindrical ceramic | 100 pF ±5% | 50 V |
| C601LR | 0275032 | Mylar, film | 0.018 μF±10% | 50 V |
| C602LR | 0252815 | Electrolytic | 4.7 μF | 50 V |
| C603LR | 0230036 | Cylindrical ceramic (except W. Germany) | 100 pF ±5% | 50 V |
| C603LR | 0240004 | Cylindrical ceramic (for W. Germany) | 220 pF ±10% | 50 V |
| C604LR | 0252231 | Electrolytic | 100 μF | 6.3 V |
| C605LR | 0276013 | Mylar, film | 0.22 μF ±10% | 50 V |
| C606LR | 0230036 | Cylindrical ceramic | 100 pF ±5% | 50 V |
| C607LR | 0252813 | Electrolytic | 3.3 μF | 50 V |
| C608LR | 0275012 | Mylar, film | 0.015 μF±10% | 50 V |
| C609LR | 1275231 | Mylar, film | 0.012 μF±5% | 50 V |
| C701LR | 0240008 | Cylindrical ceramic | 470 pF ±10% | 50 V |
| C702LR | 0252811 | Electrolytic | 1 μF | 50 V |
| C703LR | 0252231 | Electrolytic | 100 μF | 6.3 V |
| C704LR | 0252825 | Electrolytic | 47 μF | 50 V |
| C705LR | 0275015 | Mylar, film | 0.047 μF±10% | 50 V |
| C706 | 0252873 | Electrolytic | 0.22 μF | 50 V |
| C707 | 0252525 | Electrolytic | 47 μF | 16 V |
| C708 | 0240108 | Cylindrical ceramic | 0.022 μF±30% | 16 V |
| C709LR | 0230012 | Cylindrical ceramic | 10 pF ±5% | 50 V |
| C710LR | 0275015 | Mylar, film | 0.047 μF±10% | 50 V |
| C711LR | 0274013 | Mylar, film (for W. Germany) | 2200 pF ±10% | 50 V |
| C712LR | 0274013 | Mylar, film (for W. Germany) | 2200 pF ±10% | 50 V |
| C713LR | 0248704 | Ceramic, discal (except W. Germany) | 15 pF ±10% | 50 V |
| C713LR | 0248736 | Ceramic, discal (for W. Germany) | 330 pF ±5% | 50 V |
| C714 | 0276511 | Mylar, film | 0.1 μF ±10% | 100 V |
| C715 | 0252815 | Electrolytic | 47 μF | 50 V |
| C716 | 0252822 | Electrolytic | 22 μF | 50 V |
| C801 | 0245408 | Ceramic, discal | 0.01 μF ±20% | 500 V |

| SYMBOL No. | PART No. | DESCRIPTION | | |
|---|---|---|---|---|
| C802 | 0245408 | Ceramic, discal | 0.01 μF ±20% | 500 V |
| C803 | 0259933 | Electrolytic | 5600 pF | 40 V |
| C804 | 0259933 | Electrolytic | 5600 μF | 40 V |
| C805 | 0252525 | Electrolytic | 47 μF | 16 V |
| C806 | 0252525 | Electrolytic | 47 μF | 16 V |
| C807 | 0252811 | Electrolytic | 1 μF | 50 V |
| C808 | 0276511 | Mylar, film (for West Germany) | 0.1 μF ±10% | 100 V |
| ⚠ C001 | 0243899 | Ceramic, discal (for U.S.A. & Canada) | 0.01 μF $^{+100}_{-0}$% | 125 V |
| ⚠ C001 | 0243901 | Ceramic, discal (except U.S.A. & Canada) | 0.01 μF $^{+100}_{-0}$% | 400 V |
| | | **RESISTORS** | | |
| R402LR | 0129609 | Carbon film (for W. Germany) | 2.2 kΩ ±5% | SRD1/4P |
| R402LR | 0129579 | Carbon film (except W. Germany) | 560 Ω ±5% | SRD1/4P |
| R403LR | 0129647 | Carbon film | 47 kΩ ±5% | SRD1/4P |
| R404LR ≀ R407LR | 0129601 | Carbon film | 1 kΩ ±5% | SRD1/4P |
| R408LR | 0129579 | Carbon film | 560 Ω ±5% | SRD1/4P |
| R410LR | 0129639 | Carbon film | 22 kΩ ±5% | SRD1/4P |
| R411LR | 0129671 | Carbon film | 270 kΩ ±5% | SRD1/4P |
| R412LR | 0129661 | Carbon film | 100 kΩ ±5% | SRD1/4P |
| R413 | 0129617 | Carbon film | 4.7 kΩ ±5% | SRD1/4P |
| R451 ≀ R454 | 0129643 | Carbon film | 33 kΩ ±5% | SRD1/4P |
| R456 | 0129601 | Carbon film | 1 kΩ ±5% | SRD1/4P |
| R457 | 0129603 | Carbon film | 1.2 kΩ ±5% | SRD1/4P |
| R602LR | 0129617 | Carbon film | 4.7 kΩ ±5% | SRD1/4P |
| R604LR | 0129645 | Carbon film | 39 kΩ ±5% | SRD1/4P |
| R605LR | 0129641 | Carbon film | 27 kΩ ±5% | SRD1/4P |
| R606LR | 0129601 | Carbon film | 1 kΩ ±5% | SRD1/4P |
| R607LR | 0129609 | Carbon film | 2.2 kΩ ±5% | SRD1/4P |
| R608LR | 0129665 | Carbon film | 150 kΩ ±5% | SRD1/4P |
| R609LR | 0129631 | Carbon film | 10 kΩ ±5% | SRD1/4P |
| R610LR | 0129605 | Carbon film | 1.5 kΩ ±5% | SRD1/4P |
| R614LR | 0129615 | Carbon film | 3.9 kΩ ±5% | SRD1/4P |
| R615LR | 0129661 | Carbon film | 100 kΩ ±5% | SRD1/4P |
| R616LR | 0129601 | Carbon film | 1 kΩ ±5% | SRD1/4P |
| R651 ≀ R654 | 0129665 | Carbon film | 150 kΩ ±5% | SRD1/4P |
| R655 | 0129583 | Carbon film | 820 Ω ±5% | SRD1/4P |
| R656 | 0129611 | Carbon film | 2.7 kΩ ±5% | SRD1/4P |
| R657 | 0129607 | Carbon film | 1.8 kΩ ±5% | SRD1/4P |
| R658 | 0129611 | Carbon film | 2.7 kΩ ±5% | SRD1/4P |
| R659 | 0129611 | Carbon film | 2.7 kΩ ±5% | SRD1/4P |
| R660 | 0129611 | Carbon film | 2.7 kΩ ±5% | SRD1/4P |

| SYMBOL No. | PART No. | DESCRIPTION | | | |
|---|---|---|---|---|---|
| R701LR | 0129645 | Carbon film | 39 kΩ | ±5% | SRD1/4P |
| R702LR | 0129573 | Carbon film | 330 Ω | ±5% | SRD1/4P |
| R703LR | 0129647 | Carbon film | 47 kΩ | ±5% | SRD1/4P |
| R704LR | 0129613 | Carbon film | 3.3 kΩ | ±5% | SRD1/4P |
| R705LR | 0129619 | Carbon film | 5.6 kΩ | ±5% | SRD1/4P |
| R707LR | 0129607 | Carbon film | 1.8 kΩ | ±5% | SRD1/4P |
| R708LR | 0129605 | Carbon film | 1.5 kΩ | ±5% | SRD1/4P |
| R709LR | 0149551 | Wire wound | 0.22 Ω | ±10% | RWC3 |
| R712LR | 0134289 | Composition (except Switzerland) | 10 Ω | ±10% | RC1/2GF |
| ⚠ R712LR | 0113830 | Metal (fuse resistor) (for Switzerland) | 10 Ω | ±5% | RN1/2B |
| R713LR | 0119139 | Metal | 4.7 Ω | ±10% | RN2B |
| R714LR | 0134371 | Composition | 680 Ω | ±10% | RC1/2GF |
| R715LR | 0134371 | Composition | 680 Ω | ±10% | RC1/2GF |
| R716 | 0129601 | Carbon film | 1 kΩ | ±5% | SRD1/4P |
| R717 | 0129649 | Carbon film | 56 kΩ | ±5% | SRD1/4P |
| R718 | 0129639 | Carbon film | 22 kΩ | ±5% | SRD1/4P |
| R719 | 0129561 | Carbon film | 100 Ω | ±5% | SRD1/4P |
| R720 | 0129661 | Carbon film | 100 kΩ | ±5% | SRD1/4P |
| ⚠ R721 | 0110621 | Metal (fuse resistor) | 100 Ω | ±5% | RN1/4B |
| R801 | 0134379 | Composition | 3.3 kΩ | ±10% | SRD1/4P |
| R802 | 0134379 | Composition | 3.3 kΩ | ±10% | SRD1/4P |
| ⚠ R803 | 0110609 | Metal (fuse resistor) | 47 Ω | ±5% | RN1/4B |
| R804 | 0129601 | Carbon film | 1 kΩ | ±5% | SRD1/4P |
| R805 | 0129601 | Carbon film | 1 kΩ | ±5% | SRD1/4P |
| ⚠ R806 | 0110609 | Metal (fuse resistor) | 47 Ω | ±5% | RN1/4B |
| R807 | 0129651 | Carbon film | 68 kΩ | ±5% | SRD1/4P |
| R808 | 0129647 | Carbon film | 47 kΩ | ±5% | SRD1/4P |
| R809 | 0129651 | Carbon film | 68 kΩ | ±5% | SRD1/4P |
| R810 | 0129635 | Carbon film | 15 kΩ | ±5% | SRD1/4P |

**ICs & TRANSISTORS**

| | | |
|---|---|---|
| IC401 | 2369121 | TL4558P–C |
| IC402 | 2369911 | TC9145P |
| IC403 | 2369911 | TC9145P |
| IC601 | 2369121 | TL4558P–C |
| IC602LR | 2369201 | HD14066BP |
| IC701 | 2377451 | TM2001A |
| Q701LR | 2317712 | 2SC2878 Ⓑ |
| Q702 | 2328282 | 2SC458 Ⓒ |
| Q703LR | 2328656 | 2SC1740LN Ⓔ |
| Q801 | 2328962 | 2SB514AL Ⓓ |
| Q802 | 2317737 | 2SD330 Ⓓ |
| Q803 | 2328082 | 2SA844 Ⓓ |
| Q804 | 2328282 | 2SC458 Ⓒ |

**DIODES & THYRISTOR**

| | | |
|---|---|---|
| D401 | 2337011 | 1S2076 |
| ≀ | ≀ | ≀ |
| D406 | 2337011 | 1S2076 |
| D451 | 2339461 | LED LT-9230N |
| ≀ | ≀ | ≀ |
| D453 | 2339461 | LED LT-9230N |
| D454 | 2339462 | LED LT-9230H |
| D653 | 2337011 | 1S2076 |
| D655 | 2337011 | 1S2076 |
| D701LR | 2337151 | 1S2076A |
| D703 | 2337011 | 1S2076A |
| D704 | 2337762 | ERB12-01R |
| D801 | 2337461 | S4VB20 |
| D802 | 2337762 | ERB12-01R |
| D803 | 2337011 | 1S2076 |
| ZD701 | 2337569 | HZ12C-3 |
| ZD801 | 2337553 | HZ11A-3 |
| ZD802 | 2337553 | HZ11A-3 |
| SCR701 | 2338861 | Thyristor (TT201) |

**VARIABLE RESISTORS**

| | | |
|---|---|---|
| R601LR | 0166901 | 50 kΩ–(A) (MAIN VOLUME) |
| R603 | 0158591 | 200 kΩ–(W) (BALANCE) |

**COILS**

| | | |
|---|---|---|
| L701LR | 2227311 | Choke coil–2.5 μH |

**MISCELLANEOUS**

| | | |
|---|---|---|
| | 2678347 | 6P US pin jack |
| | 2678348 | 4P US pin jack |
| | 2677646 | Headphone jack |
| | 2688161 | Speaker terminal |
| ⚠ S001 | 2639512 | Power switch (for U.S.A. & Canada) |
| ⚠ S001 | 2639513 | Power switch (except U.S.A. & Canada) |
| S651 | 2639811 | Push switch (SOUND CHARACTER MODE) |
| ≀ | ≀ | ≀ |
| S654 | 2649811 | Push switch (SOUND CHARACTER MODE) |
| S451 | 2639682 | Tact switch (FUNCTION) |
| ≀ | ≀ | ≀ |
| S454 | 2639682 | Tact switch (FUNCTION) |
| ⚠ F001 | 2727191 | Fuse T1A (except U.S.A. & Canada) |
| ⚠ F001 | 2727964 | Fuse 2.5A,125V (for U.S.A. & Canada) |
| ⚠ F701LR | 2727335 | Fuse-2.5A (except U.S.A. & Canada) |
| ⚠ F701LR | 2727964 | Fuse 2.5A, 125V (for U.S.A. & Canada) |

**for FINAL ASSEMBLY**

| | | |
|---|---|---|
| | 4021464 | Front panel ass'y |
| | 3953411 | Power button |
| | 3953401 | Push button (SOUND CHARACTER MODE) |
| | 3292555 | Knob (BALANCE) |
| | 4444484 | Cover |
| | 3954002 | Slide button (VOLUME) |
| | 3927411 | Leg |
| | 2339441 | LED array |
| ⚠ T001 | 2248112 | Power transformer (for U.S.A. & Canada) |
| ⚠ T001 | 2248113 | Power transformer (except U.S.A., Canada, Asia & Latin American countries, etc.) |
| ⚠ T001 | 2248114 | Power transformer (for Asia & Ltain American countries, etc.) |
| | 4567431 | 3φ × 6DT bind screw (for front panel) |
| | 8691308 | 2.6φ × 8 bind tapping screw (for P.W.B.) |
| | 4567412 | 3φ × 8DT bind screw (for mecha-plate, others) |
| | 4567411 | 3φ × 6DT bind screw (for slide volume, others) |
| | 4567454 | 3φ × 12DT bind screw (for P.W.B., others) |
| | 4567451 | 3φ × 6DT bind screw (for heat sink holder) |
| | 4567422 | 4φ × 8DT bind screw (for P.trans.) |
| | 4567432 | 3φ × 8DT bind screw (for rear plate) |
| | 4784106 | 3φ × 10 bind tapping screw (for speaker terminal, US pin) |
| | 4575952 | 3φ × 8DT screw with washer (for heat sink holder) |

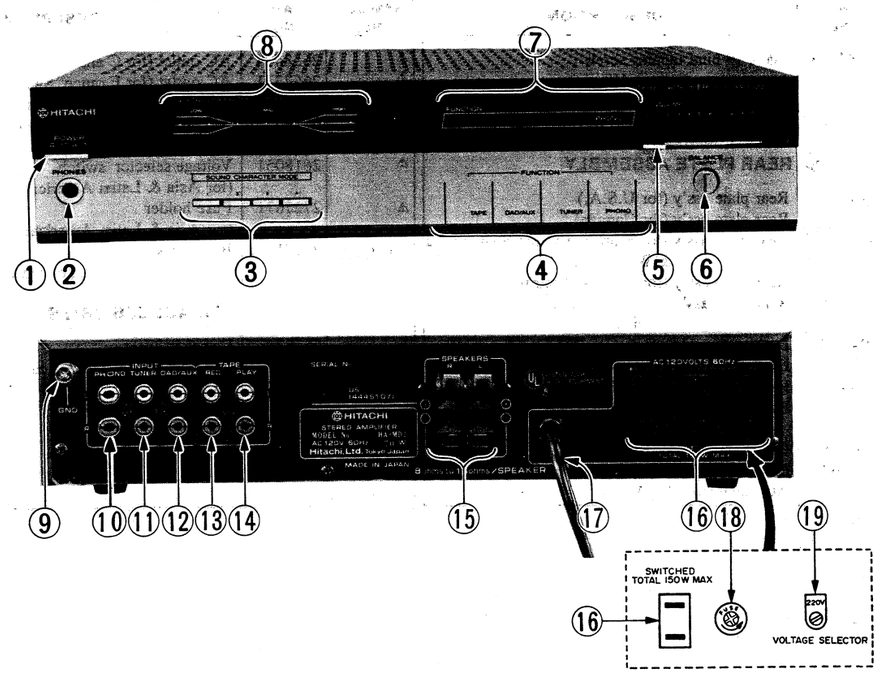
**for REAR PLATE ASSEMBLY**

| | | |
|---|---|---|
| | 4445107 | Rear plate ass'y (for U.S.A.) |
| | 4445108 | Rear plate ass'y (for Canada) |
| | 4445109 | Rear plate ass'y (for France, Sweden, Switzerland & W. Germany) |
| | 4445802 | Rear plate ass'y (for U.K. & Australia) |
| | 4445100 | Rear plate ass'y (for Asia & Latin countries, etc.) |
| ⚠ | 0043793 | Bushing (for U.S.A. & Canada) |
| ⚠ | 3913006 | Bushing (except U.S.A. & Canada) |
| ⚠ | 2749471 | Power supply cord (for U.S.A. & Canada) |
| ⚠ | 2748752 | Power supply cord (except U.S.A., Canada, U.K. & Australia) |
| ⚠ | 2749582 | Power supply cord (for U.K.) |
| ⚠ | 2749622 | Power supply cord (for Australia) |
| ⚠ | 2658413 | AC outlet (for U.S.A.) |
| ⚠ | 2658414 | AC outlet (for Canada) |
| ⚠ | 2657741 | AC outlet (for France, Switzerland, Sweden & West Germany) |
| ⚠ | 2658372 | AC outlet (for Asia & Latin American countries, etc.) |
| ⚠ | 2618051 | Voltage selector switch (for Asia & Latin American countries, etc.) |
| ⚠ | 2727671 | Fuse holder (for Asia & Latin American countries, etc.) |
| ⚠ F001 | 2727191 | Fuse-T1A (for Asia & Latin American countries, etc.) |

**for ACCESSORIES**

| | | |
|---|---|---|
| ⚠ | 2658361 | E socket adaptor (for Asia & Latin American countries, etc.) |
| ⚠ | 2727193 | Fuse - T2A (for Asia & Latin American countries, etc.) |

## FRONT AND REAR PANEL • VORDERE UND HINTERE BEDIENUNGSTAFEL • PANNEAUX AVANT ET ARRIERE




for Asia and Latin America

① POWER switch
② PHONES jack
③ SOUND CHARACTER MODE switches
④ FUNCTION switches
⑤ VOLUME control
⑥ BALANCE control
⑦ FUNCTION display
⑧ SOUND CHARACTER DISPLAY
⑨ Ground terminal (GND)
⑩ PHONO INPUT jacks
⑪ TUNER INPUT jacks
⑫ DAD/AUX INPUT jacks
⑬ TAPE REC jacks
⑭ TAPE PLAY jacks
⑮ SPEAKERS terminals
⑯ AC outlets (3 outlets for Canada, 1 outlet for Europe, Asia and Latin America)
⑰ Power supply cord
⑱ FUSE holder (for Asia and Latin America)
⑲ VOLTAGE SELECTOR (for Asia and Latin America)

① Netzschalter (POWER)
② Kopfhörerbuchse (PHONES)
③ Klangcharakteristik-Schalter (SOUND CHARACTER MODE)
④ Funktionsschalter (FUNCTION)
⑤ Lautstärkeregler (VOLUME)
⑥ Balanceregler (BALANCE)
⑦ Funktionsanzeige (FUNCTION)
⑧ Klangcharakteristik-Anzeige (SOUND CHARACTER DISPLAY)
⑨ Erdklemme (GND)
⑩ Phono-Eingangsbuchsen (PHONO INPUT)
⑪ Tuner-Eingangsbuchsen (TUNER INPUT)
⑫ DAD/AUX-Eingangsbuchsen (DAD/AUX INPUT)
⑬ Aufnahmebuchsen für Tonband (TAPE REC)
⑭ Wiedergabebuchsen für Tonband (TAPE PLAY)
⑮ Lautsprecherklemmen (SPEAKERS)
⑯ Netzausgänge (3 Ausgänge für Kanada, 1 Ausgang für Europa, Asien und Lateinamerika)
⑰ Netzkabel
⑱ Sicherungshalterung (FUSE) (für Asien und Lateinamerika)
⑲ Spannungswähler (VOLTAGE SELECTOR) (für Asien und Lateinamerika)

① Interrupteur d'alimentation (POWER)
② Prise de casque d'écoute (PHONES)
③ Touches de mode de caractéristique sonore (SOUND CHARACTER MODE)
④ Sélecteurs de fonction (FUNCTION)
⑤ Réglages de volume (VOLUME)
⑥ Réglage de balance (BALANCE)
⑦ Affichage de fonction (FUNCTION)
⑧ Affichage de caractéristique sonore (SOUND CHARACTER DISPLAY)
⑨ Borne de mise à la terre (GND)
⑩ Prises d'entrée de table de lecture (PHONO INPUT)
⑪ Prises d'entrée de tuner (TUNER INPUT)
⑫ Prises d'entrée d'équipement auxiliaire (DAD/AUX INPUT)
⑬ Prises d'enregistrement magnétophone (TAPE REC)
⑭ Prises de lecture magnétophone (TAPE PLAY)
⑮ Bornes d'enceintes acoustiques (SPEAKERS)
⑯ Sorties de courant secteur (3 sorties pour le Canada, 1 sortie pour l'Europe, l'Asie et l'Amérique Latine)
⑰ Cordon d'alimentation
⑱ Porte-fusible (FUSE) (Pour l'Asie et l'Ameique Latine)
⑲ Sélecteur de tension (VOLTAGE SELECTOR) (Pour l'Asie et l'Amérique Latine)



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